

0950000000--Knox
Knox County Housing Authority
IL0981795503
Superfund Technical

5E04U-A0403

NFA-944
1/20/89

RECEIVED

JAN 4 - 1989

Pre Remedial
Unit

17, 18, 19
substances

CERCLA

Preliminary

Assessment

Report



Illinois Environmental
Protection Agency
P.O. Box 19276,
Springfield, IL 62794-9276

Executive Summary

The Knox County Housing Authority is located northwest of the corner of Knox Street and Michigan Avenue in Galesburg, Illinois, Section 13, Township 11 North, Range 1 East. The Housing Authority is owned by the United States Department of Housing and Urban Development and is operated by the Knox County Housing Authority, 2555 West Tompkins, Galesburg, IL, 61401 (309)342-8129.

On November 13, 1986, the Agency received a complaint from [non responsive -personal privacy information] [non responsive -personal privacy information] Cleveland, Ohio 44108. [non responsive -personal privacy information] was a former resident of the Housing project. [non responsive -personal privacy information] was alleging that her children and another resident's children [non responsive -personal privacy information] were sick due to the housing projects location on a former disposal site. [non responsive -personal privacy information] and [non responsive -personal privacy information] children were reported to be ill with epilepsy, asthma and heart ailments. [non responsive -personal privacy information] moved out of the housing project in June, 1988 and can be contacted by calling [non responsive -personal privacy information] [non responsive -personal privacy information]

On October 11, 1988 a Preliminary Assessment reconnaissance inspection was conducted at the Knox County Housing Authority. No obvious signs of contamination were noted during the inspection. During the reconnaissance inspection the Kiwanis Park site was also checked for potential exposure pathways which may carry contaminants off-site and on to the Housing Authority.

The Housing Authority utilizes the City of Galesburg public water supply. No evidence of leachate at the Kiwanis Park was observed and a good stand of vegetative cover was present over the entire site. A small intermittent stream is present at the southeast corner of the park. The stream flows east with no obvious signs of contamination noted.

There is no documented evidence of the disposal or storage of any hazardous waste at the Knox County Housing Authority.

This site has been classified as a non-site, with no further action required.



POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

I. IDENTIFICATION

01 STATE 02 SITE NUMBER

ILD 981795503

II. SITE NAME AND LOCATION

01 SITE NAME (i.e., common, or descriptive name of site)

Knox County Housing Authority

02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER

N.W. Corner of Knox Street and Michigan Ave

03 CITY

Galesburg

04 STATE

IL

05 ZIP CODE

61401

06 COUNTY

Knox

07 COUNTY CODE

095

08 CONG DIST

17

09 COORDINATES LATITUDE

40 56 30.0

LONGITUDE

090 20 35.0

10 DIRECTIONS TO SITE (Starting from nearest public road)

III. RESPONSIBLE PARTIES

01 OWNER (if known)

United States Housing and Urban Development

02 STREET (Business, mailing, residential)

524 South 2nd

03 CITY

Springfield

04 STATE

IL

05 ZIP CODE

62701

06 TELEPHONE NUMBER

(217) 492-4085

07 OPERATOR (if known and different from owner)

Knox County Housing Authority

08 STREET (Business, mailing, residential)

255 West Tompkins

09 CITY

Galesburg

10 STATE

IL

11 ZIP CODE

61401

12 TELEPHONE NUMBER

(309) 342-8129

13 TYPE OF OWNERSHIP (Check one)

☐ A. PRIVATE ☐ B. FEDERAL:

(Agency name)

☐ C. STATE

☒ D. COUNTY

☐ E. MUNICIPAL

☐ F. OTHER:

(Specify)

☐ G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)

☐ A. RCRA 3001 DATE RECEIVED: MONTH DAY YEAR

☐ B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: MONTH DAY YEAR

☒ C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION

☒ YES

DATE 10 / 11 / 88

☐ NO

BY (Check all that apply)

☐ A. EPA

☐ B. EPA CONTRACTOR

☒ C. STATE

☐ D. OTHER CONTRACTOR

☐ E. LOCAL HEALTH OFFICIAL

☐ F. OTHER:

(Specify)

CONTRACTOR NAME(S):

02 SITE STATUS (Check one)

☐ A. ACTIVE

☒ B. INACTIVE

☐ C. UNKNOWN

03 YEARS OF OPERATION

BEGINNING YEAR

ENDING YEAR

☒ UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED

No evidence of any hazardous substances on-site.

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION

No evidence to support a potential of a hazard to Environment or Population.

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)

☐ A. HIGH

(Inspection required promptly)

☐ B. MEDIUM

(Inspection required)

☐ C. LOW

(Inspect on time available basis)

☒ D. NONE

(No further action needed, complete current disposition forms)

VI. INFORMATION AVAILABLE FROM

01 CONTACT

Ms Alice Egan

02 OF (Agency/Organization)

Knox County Housing Authority

03 TELEPHONE NUMBER

(309) 342-8129

04 PERSON RESPONSIBLE FOR ASSESSMENT

Gary L. Reside

05 AGENCY

IEPA

06 ORGANIZATION U

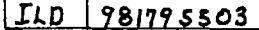
Pre-Remedial Program

07 TELEPHONE NUMBER

(217) 782-6760

08 DATE

10 / 31 / 88



I HIGHLY VOLATILE
J EXPLOSIVE
K REACTIVE
L INCOMPATIBLE
M NOT APPLICABLE

EPA FORM 2070-12 (7-81)



POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT

PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE 02 SITE NUMBER
ILD 981795503

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☐ A. GROUNDWATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED

02 ☐ OBSERVED (DATE _____)
04 NARRATIVE DESCRIPTION

POTENTIAL ALLEGED

No Evidence

01 ☒ B. SURFACE WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED

02 ☐ OBSERVED (DATE _____)
04 NARRATIVE DESCRIPTION

☒ POTENTIAL ☐ ALLEGED

5,000
A small intermittent stream is located approximately 200 yards off-site on the Kiwanis Park site. This stream flows away from the Housing Project (to the east). The potential of off-site contamination by direct contact with the stream is possible.

01 ☐ C. CONTAMINATION OF AIR
03 POPULATION POTENTIALLY AFFECTED

02 ☐ OBSERVED (DATE _____)
04 NARRATIVE DESCRIPTION

POTENTIAL ALLEGED

No Evidence

01 ☐ D. FIRE/EXPLOSIVE CONDITIONS
03 POPULATION POTENTIALLY AFFECTED

02 ☐ OBSERVED (DATE _____)
04 NARRATIVE DESCRIPTION

POTENTIAL ALLEGED

No Evidence

01 ☒ E. DIRECT CONTACT
03 POPULATION POTENTIALLY AFFECTED

02 ☐ OBSERVED (DATE _____)
04 NARRATIVE DESCRIPTION

☒ POTENTIAL ☐ ALLEGED

5,000
While no waste was disposed of on-site, there is a potential for direct contact exposure by the residents of the Housing Authority who utilize the park.

01 ☐ F. CONTAMINATION OF SOIL
03 AREA POTENTIALLY AFFECTED (Acres)

02 ☐ OBSERVED (DATE _____)
04 NARRATIVE DESCRIPTION

POTENTIAL ALLEGED

No Evidence

01 ☐ G. DRINKING WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED

02 ☐ OBSERVED (DATE _____)
04 NARRATIVE DESCRIPTION

POTENTIAL ALLEGED

No Evidence

01 ☐ H. WORKER EXPOSURE/INJURY
03 WORKERS POTENTIALLY AFFECTED

02 ☐ OBSERVED (DATE _____)
04 NARRATIVE DESCRIPTION

POTENTIAL ALLEGED

No Evidence

01 ☒ I. POPULATION EXPOSURE/INJURY
03 POPULATION POTENTIALLY AFFECTED

02 ☐ OBSERVED (DATE _____)
04 NARRATIVE DESCRIPTION

POTENTIAL ☒ ALLEGED

5,000
On November 13, 1988, non responsive - personal privacy information (Former Resident) complained to the IEPA that her children and a neighbors children were ill due to the disposal of hazardous waste. Ms. Zacharias also reportedly surveyed other residents in the projects and the majority reported illness. There is no documented evidence to support these allegations.



POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE 02 SITE NUMBER
IL0 981795503

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☐ J. DAMAGE TO FLORA
04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE: _____)

☐ POTENTIAL

☐ ALLEGED

No Evidence

01 ☐ K. DAMAGE TO FAUNA
04 NARRATIVE DESCRIPTION (Include name(s) of species)

02 ☐ OBSERVED (DATE: _____)

☐ POTENTIAL

☐ ALLEGED

No Evidence

01 ☐ L. CONTAMINATION OF FOOD CHAIN
04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE: _____)

☐ POTENTIAL

☐ ALLEGED

No Evidence

01 ☐ M. UNSTABLE CONTAINMENT OF WASTES
(Spills, runoff, standing liquids, leaking drums)
03 POPULATION POTENTIALLY AFFECTED _____

02 ☐ OBSERVED (DATE: _____)

☐ POTENTIAL

☐ ALLEGED

04 NARRATIVE DESCRIPTION

No Evidence

01 ☐ N. DAMAGE TO OFFSITE PROPERTY
04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE: _____)

☐ POTENTIAL

☐ ALLEGED

No Evidence

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs
04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE: _____)

☐ POTENTIAL

☐ ALLEGED

No Evidence

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING
04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE: _____)

☐ POTENTIAL

☐ ALLEGED

No Evidence

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

III. TOTAL POPULATION POTENTIALLY AFFECTED: 5,000

IV. COMMENTS

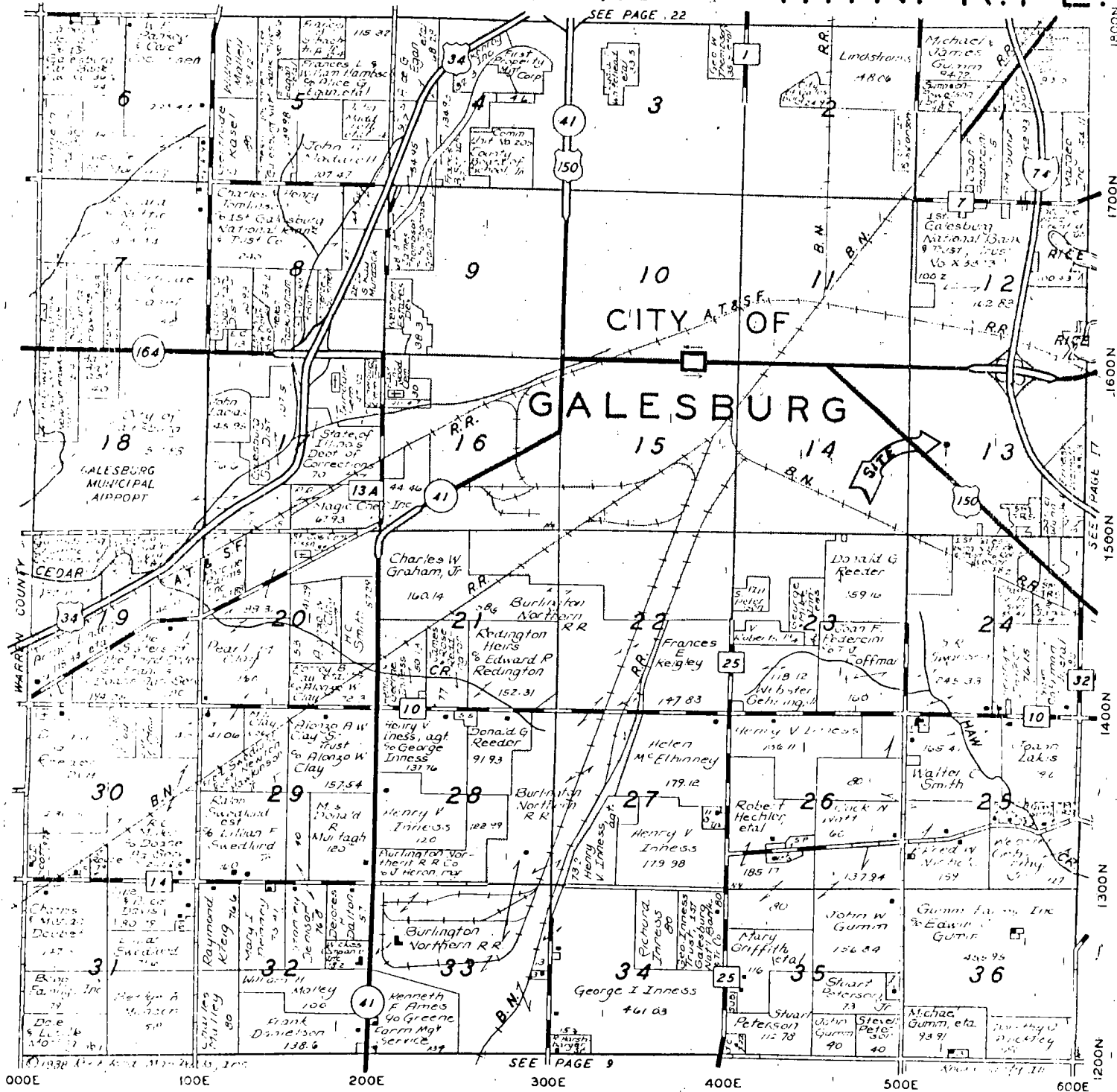
V. SOURCES OF INFORMATION (Cite specific references, e. g., state files, sample analysis, reports)

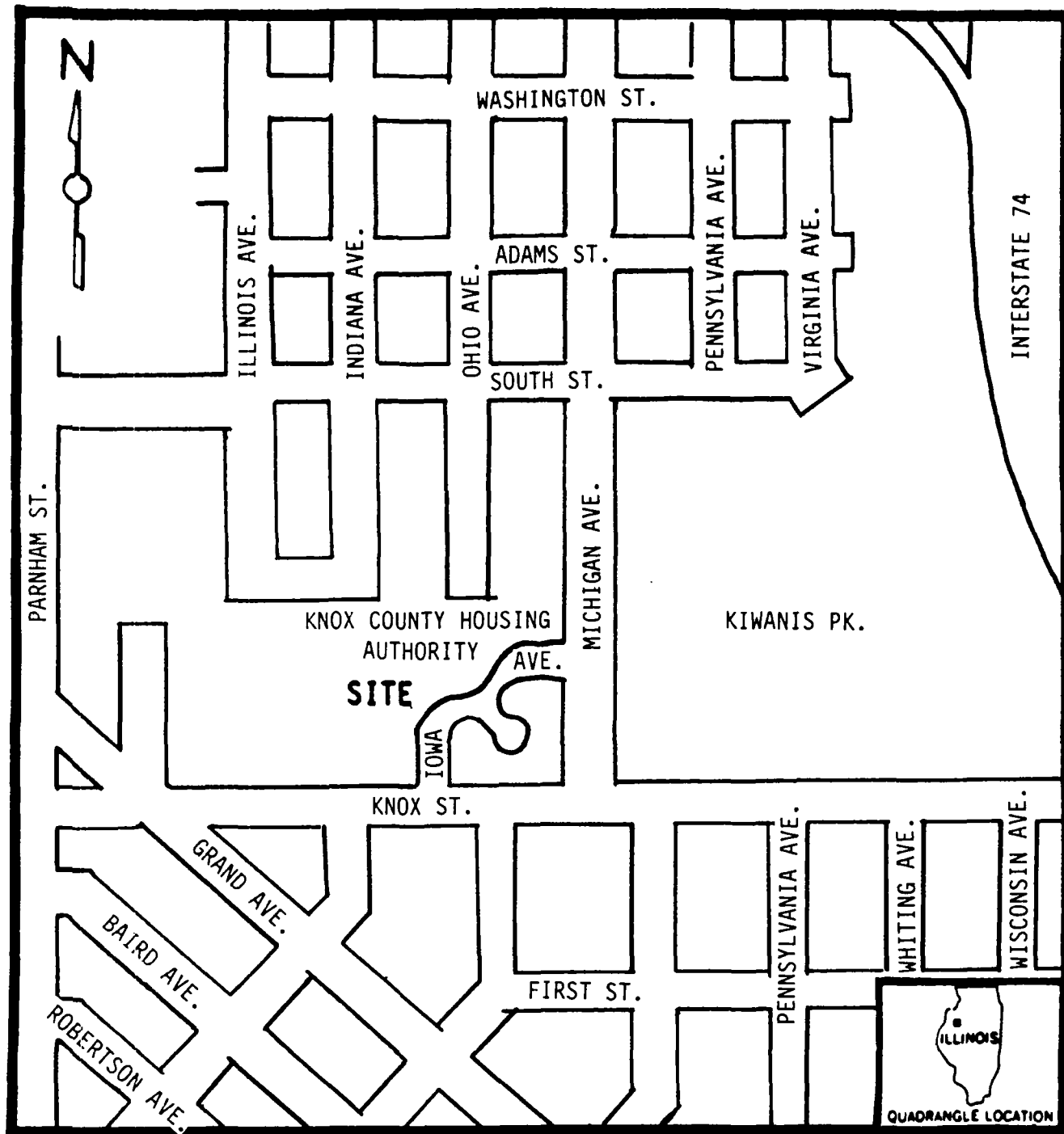
Ms Alice Egan - Knox County Housing Authority Executive Director (Part 3, sec I)
USGS - 7.5 Topographical Map (Part 3)
IEPA Reconnaissance Inspection (Part 3)
IEPA/DLPC Division File (Part 3)
non responsive - personal privacy information

KNOX COUNTY HOUSING AUTHORITY
GALESBURG, IL



SITE LOCATION

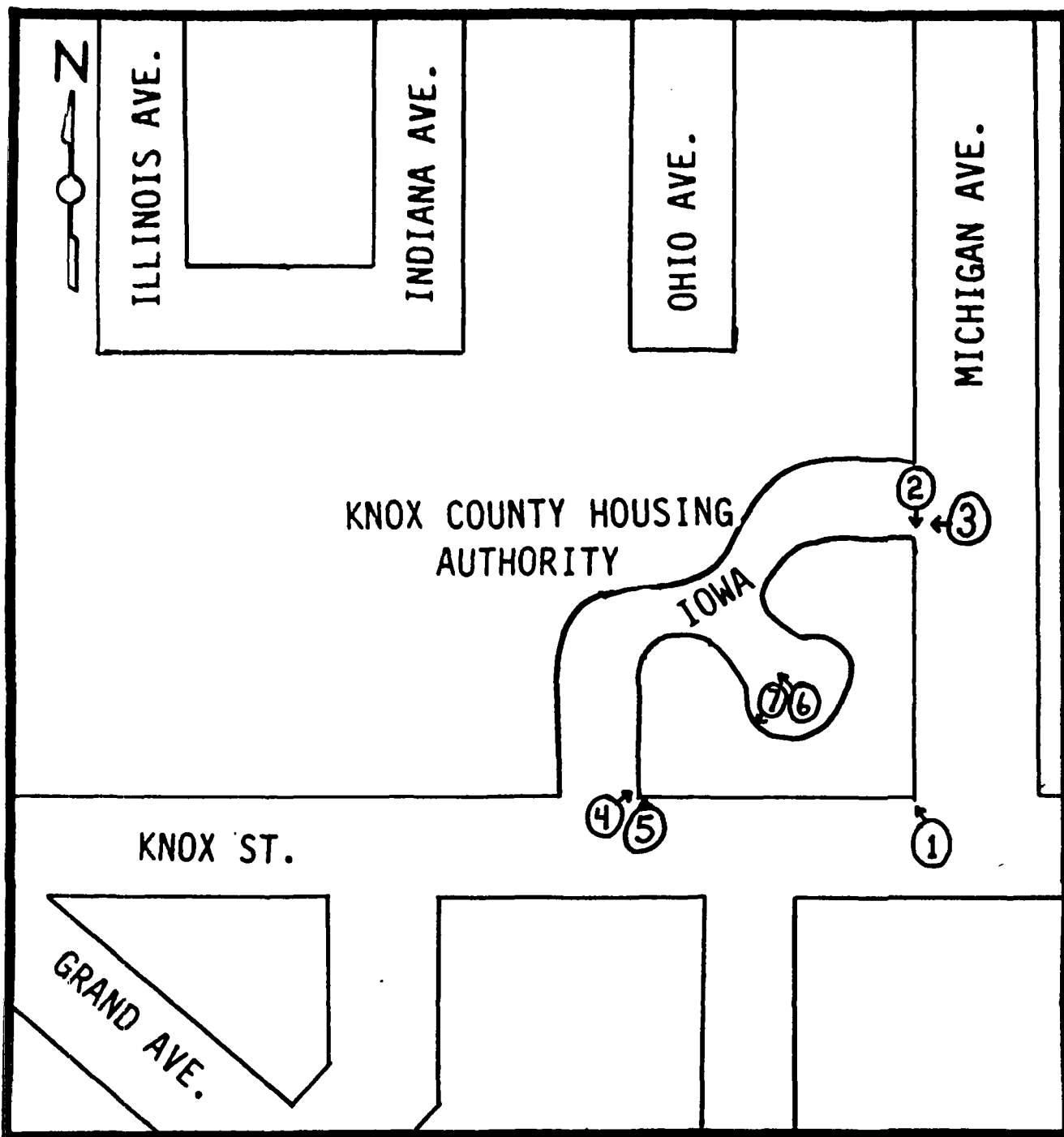




SOURCE: IEPA, 1988.

Map Not to Scale

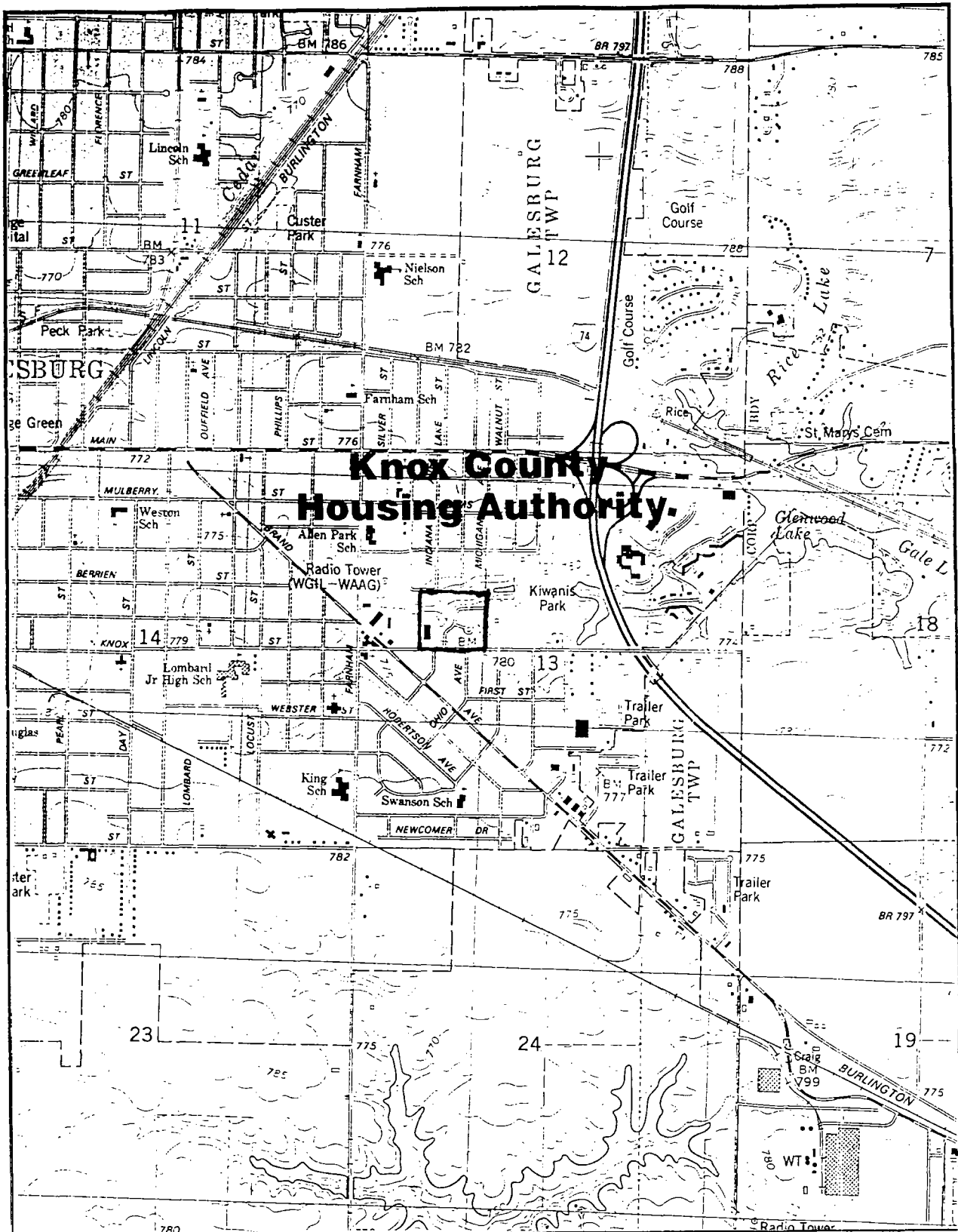
SITE LOCATION



SOURCE: IEPA, 1988.

Map Not to Scale

Site Photographic Map



Source:

U.S. Geological Survey, Topographic maps,
Galesburg West, IL, 1982 and Galesburg East, IL
1982; 15 minute quadrangles

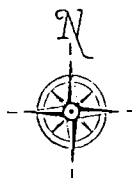


Figure 1
Site Location Map

Knox County Housing Authority
Galesburg, Illinois

DATE: 10-11-88

TIME: 8:30 A.M.

Photograph by:

Gary L. Reside

Location:

Knox County Housing Authority
Galesburg, IL

Comments: Picture taken toward

Northwest view of the site.

Corner of Knox and Michigan.

#1



DATE: 10-11-88

TIME: 8:30 A.M.

Photograph by:

Gary L. Reside

Location: ILD981795503

Knox County Housing Authority

Comments: Picture taken toward

Southern view of the site

from the intersection of

Iowa and Michigan streets.

#2



DATE: 10-11-88

TIME: 8:30 A.M.

Photograph by:

Gary L. Reside

Location:

Knox County Housing Authority

Galesburg, IL

Comments: Picture taken toward

West view of the site from
the intersection of Iowa and

Michigan streets.

#3



DATE: 10-11-88

TIME: 8:30 A.M.

Photograph by:

Gary L. Reside

Location: ILD981795503

Knox County Housing Authority

Comments: Picture taken toward

Northeast view of the site
from the intersection of
Iowa and Knox streets.

#4



DATE: 10-11-88

TIME: 8:30 A.M.

Photograph by:

Gary L. Reside

Location:

Knox County Housing Authority
Galesburg, Ia

Comments: Picture taken toward

Northern view of the site
from the intersection of
Knox and Iowa Streets.

#5



DATE: 10-11-88

TIME: 8:30 A.M.

Photograph by:

Gary L. Reside

Location: ILD981795503

Knox County Housing Authority

Comments: Picture taken toward

Northwestern view of the
site from the apex of
the Iowa circle drive.

#6



DATE: 10-11-88

TIME: 8:30 A.M.

Photograph by:

Gary L. Reside

Location:

Knox County Housing Authority

Galesburg, IL ILD981795503

Comments: Picture taken toward

southwest view of the circle

drive on Iowa street

#7



DATE: _____

TIME: _____

Photograph by:

Location: _____

Comments: Picture taken toward

Supporting Documentation

EXECUTIVE SUMMARY

Kiwanis Park, L0950000000, ILD980606768, is located at Knox and Michigan Avenue in Galesburg, Illinois and Knox County. This is a municipally owned park that was used as a random dump site starting in 1967.

The quantity of material, physical state and waste characteristics are unknown. The first inspection of this random dump site was on March 28, 1967 by the Department of Public Health. It was found through this inspection that the existing refuse should be completely covered with suitable earth. On May 18, 1967, Department of Public Health sanitary inspectors, DeVore and Quandahl, inspected the random dump site and found that the refuse had been completely covered. An inspection of Kiwanis Park was conducted by Glenn Savage and Lisa Bennett, DLPC/FOS, on March 20, 1985. The purpose of this investigation was to determine if adequate cover was present and to inspect the banks of the creek for leachate. Insufficient cover was noted in a small area of the landfill. There was no evidence of leachate observed and a good stand of vegetative cover was present over the entire site.

On November 13, 1986, Bob Casteel of this office (IEPA/DLPC) received a call from [redacted] non responsive -personal privacy information Ohio 44108, concerning a former disposal site which was operated in the vicinity of the Knox County Housing Authority, Knox and Michigan Avenue. According to [redacted] non responsive -personal privacy information, her children and the children of a friend who lives in the project are ill with asthma, heart ailments, epilepsy, etc. (Ms. [redacted] non responsive -personal privacy information once lived in the housing project). [redacted] non responsive -personal privacy information reportedly surveyed other residents in the project and the majority of the families reported illnesses. There is no documented evidence to support the above allegations. This information was reported to the Illinois Department of Public Health.

It is not known what hazardous wastes, if any, were dumped at this random dump site. The potential for surface water contamination could exist, therefore, a medium priority is assigned and an inspection is required.

KP:tk:4/17/39(12/4/86)

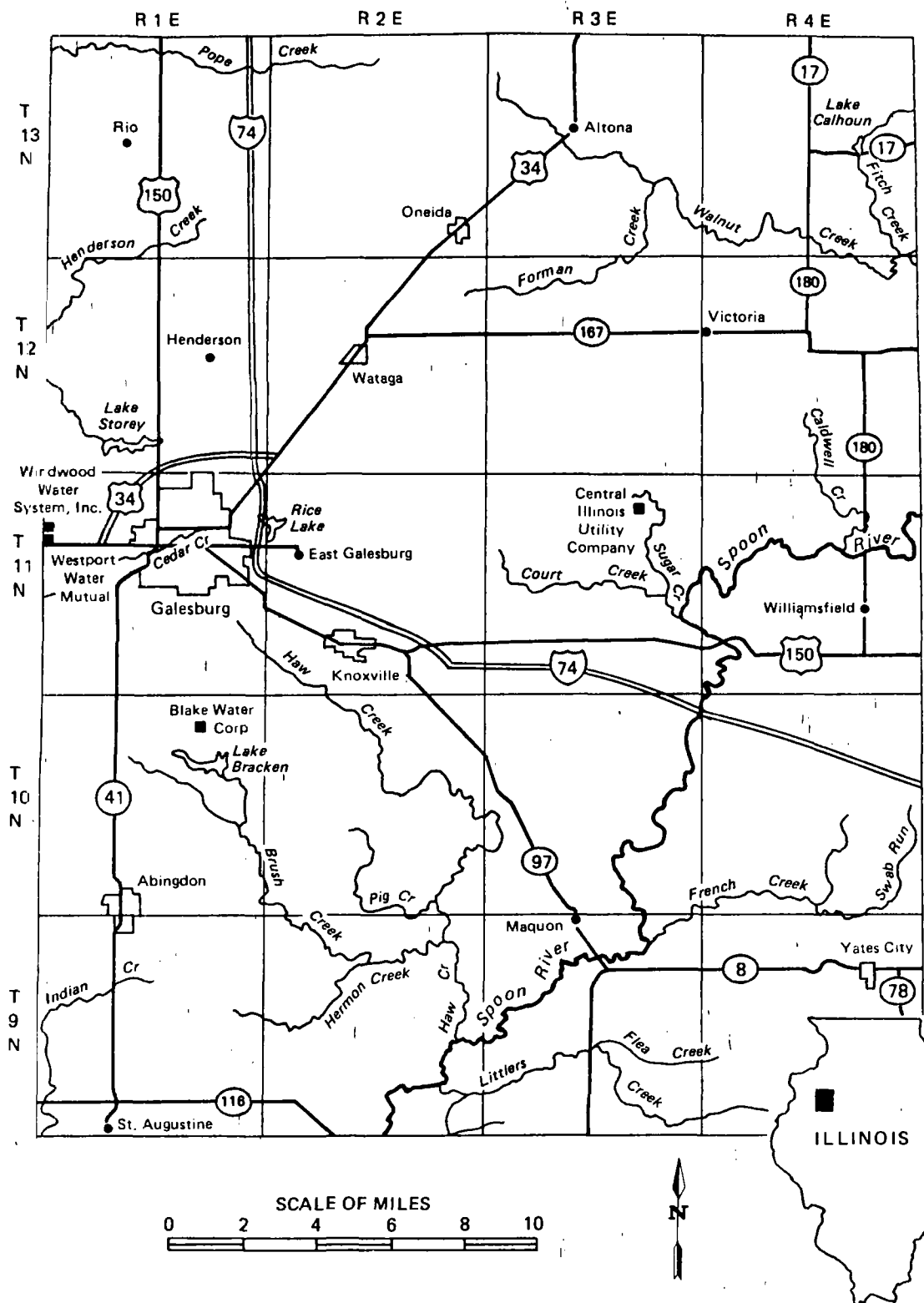


Figure 2. Locations of public ground-water supplies in Knox County

PUBLIC GROUND-WATER SUPPLIES IN KNOX COUNTY

by *Dorothy M. Woller, Ellis W. Sanderson, Michael L. Sargent,¹ and Robert D. Olson*

INTRODUCTION

This publication presents all available information on production wells used for public ground-water supplies in Knox County. Bulletin 60, which is divided into separate publications by county, supersedes Bulletin 40 and its Supplements 1 and 2.

This report includes separate descriptions for 18 public ground-water supplies in Knox County. These are preceded by brief summaries of the ground-water geology and hydrology of the county and the development of ground-water sources for public use. An explanation of the format used in the descriptions is also given.

Acknowledgments. This report was prepared under the general direction of Richard G. Semonin, Chief of the Illinois State Water Survey. John W. Brothier, Jr., supervised the preparation of the illustrations. The annual pumpage information was provided by James R. Kirk. The chemical analyses, unless otherwise stated, were made by personnel of the Water Survey Analytical Chemistry Laboratory Unit under the supervision of James C. Whitney. The analyses made by personnel of the Illinois Environmental Protection Agency were under the supervision of Roger Selburg. Ross D. Brower, Associate Geologist, Illinois State Geological Survey, reviewed the geological information in the manuscript. Grateful acknowledgment also is given to consulting engineers, well drillers, water superintendents, and municipal officials who have provided valuable information used in this report.

GROUND-WATER GEOLOGY AND HYDROLOGY

The geology of Knox County is described generally in Illinois State Geological Survey Circular 222, "Groundwater Geology in Western Illinois, North Part"; in Illinois State Geological Survey Report of Investigation 221, "Ground-Water Geology of the Rock Island, Monmouth, Galesburg, and Kewanee Area, Illinois"; and in Illinois State Water Survey and State Geological Survey Cooperative Groundwater Report 10, "Geology, Hydrology, and Water Quality of the Cambrian and Ordovician Systems in Northern Illinois." The following brief discussion of geologic conditions in the county is taken largely from these publications. For more detailed information concerning the geology in this part of the state, the reader is referred to the State Geological Survey. More detailed

information concerning the ground-water hydrology and water quality may be obtained from the Water Survey. The Surveys are located on the campus of the University of Illinois at Urbana-Champaign.

Unconsolidated Deposits

The Prairie Aquigroup (see figure 1) is established within the unconsolidated glacial deposits which blanket Knox County, forming the present land surface. These deposits consist mostly of glacial drift but may also contain locally important deposits of loess and alluvium along the Spoon River and other streams. The drift is generally less

¹Illinois State Geological Survey

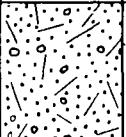

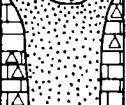
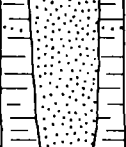








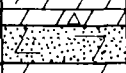

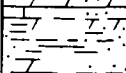
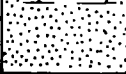



SYSTEM	SERIES	GROUP OR FORMATION	HYDROSTRATIGRAPHIC UNITS AQUIGROUP		LOG	THICKNESS (ft)	GENERALIZED DESCRIPTION
QUATERNARY	PLEISTOCENE		Prairie	Pleistocene		0 - 125	Till, gravel, sand, silt, peat, loess
PENNSYLVANIAN	DESMOINESIAN and ATCKIAN	Carbondale Spoon Abbott	Upper Bedrock	Pennsylvanian		0 - 460	Shale, sandstone, clay, limestone, coal
	VALMEYERAN	Burlington		Burlington aquifer		0 - 140	Limestone, white to brown, very cherty, fossiliferous, dolomitic
MISSISSIPPIAN	KINDERHOOKIAN	New Albany	Mississippi Valley	Mississippian Devonian confining unit		0 - 250	Shale, green to brown, pyritic, <i>Sporangites</i> , little sandstone and dolomite
	UPPER						
DEVONIAN	MIDDLE	Cedar Valley- Wapsipicon		Devonian		40 - 155	Limestone and dolomite, silty, cherty, fine gray to buff, part slightly pyritic
SILURIAN	NIAGARAN	Racine - Marcus		Silurian dolomite aquifer		0 - 220	Dolomite, crystalline, vesicular, white to gray, partly cherty
	ALEXANDRIAN					20 - 80	Dolomite, dense to vesicular, silty and sandy in lower part
ORDOVICIAN	CINCINNATIAN	Maquoketa	Midwest Bedrock	Maquoketa confining unit		80 - 210	Shale, dolomitic, green to gray, some dolomite
	CHAMPLAINIAN	Galena		Galena Platteville unit		215 - 275	Dolomite and limestone, medium-grained, cherty in lower part
		Platteville				60 - 100	Dolomite, fine grained, cherty
		Glenwood- St. Peter		Ancell aquifer		140 - 210	Sandstone, medium grained, friable, mostly white
	CANADIAN	Shakopee		Middle confining unit		190 - 270	Dolomite, cherty, few sandstone beds
		New Richmond				15 - 80	Sandstone, some dolomite
		Oneota				200 - 270	Dolomite, cherty, medium crystalline
		Gunter				0 - 10	Sandstone, dolomitic
CAMBRIAN	ST. CROIXAN	Eminence	Middle confining unit	Eminence Potosi		230 - 300	Dolomite, light colored, sandy, thin sandstones Dolomite, fine grained, gray to brown, drusy quartz
		Potosi				160 - 230	Dolomite, sandstone and shale, glauconitic, green to red, micaceous
		Franconia		Franconia		110 - 200	Sandstone, fine to coarse grained, well sorted, upper part dolomitic
		Ironton		Ironton-Gales- ville aquifer			
		Galesville					

Figure 1. Generalized column of rock stratigraphic units and aquigroups in Knox County

than 50 ft thick, with bedrock outcrops along many of the creeks, and contains little water-bearing sand and gravel. Small domestic supplies can sometimes be obtained from large-diameter bored wells that tap thin lenses of sand and gravel present in the drift.

The most favorable prospects for developing ground-water supplies from the Prairie Aquigroup are usually in areas of thicker drift that are commonly situated along pre-glacial bedrock valleys where glacial meltwater deposited significant quantities of clean sand and gravel. About 50 to 100 ft of drift is present in buried or partially buried bedrock valleys located near Rio, west of Galesburg, and near the present Spoon River valley.

The municipal water-supply potential of these more favorable areas remains virtually unexplored in Knox County. Galesburg obtained its supply from drift wells in the Cedar Creek bottomlands until about 1920, and Williamsfield conducted exploratory work in the glacial deposits and alluvium along the Spoon River without establishing a supply. Yates City remains the only municipality with a well that receives a contribution of water (less than 100 gpm) from sand and gravel deposits in the Prairie Aquigroup. Only through an exploratory program that includes a review of well records, geophysical testing, and test drilling can sand and gravel aquifers capable of producing more than a domestic water supply be located and verified.

Bedrock

Beneath the glacial drift, the upper bedrock formations consist principally of shale with thin beds of sandstone and limestone. The total sequence of sedimentary rocks in Knox County ranges in geologic age from Pennsylvanian to Cambrian (see generalized stratigraphic sequence in figure 1).

Pennsylvanian rocks underlie the Prairie Aquigroup and form the bedrock surface throughout the county except in a very small area at the southwest corner where they have been eroded, exposing the Mississippian rocks at the bedrock surface. The Pennsylvanian rocks range in thickness from a featheredge near the eroded area in the southwest corner to as much as 460 ft in the north part of the county. In a few areas, water-yielding sandstone, siltstone, and fractured shale lie near the bedrock surface and constitute an Upper Bedrock Aquigroup. This aquigroup functions hydrologically like the Prairie Aquigroup, with which it may be interconnected.

In most of Knox County the upper bedrock surface consists of tight, impermeable Pennsylvanian shale. These shales form the upper part of the Mississippi Valley

Aquigroup, which generally acts as a confining bed hydraulically separating the Prairie Aquigroup and lower parts of the Mississippi Valley Aquigroup. In some areas the shale contains intervals of water-bearing sandstone.

A few total or supplemental public water supplies in southern and western Knox County have been obtained from Pennsylvanian strata that comprise the Upper Bedrock or Mississippi Valley Aquigroups. In these isolated cases, well yields of 20 to 50 gpm have been reported, but yields barely adequate for domestic or farm supplies are more common.

The Burlington aquifer (Mississippian age) is the next-lower part of the Mississippi Valley Aquigroup in the south one-half of Knox County where it underlies the Pennsylvanian rocks, except for the small area in the southwest corner where it directly underlies the glacial drift. It lies at a depth of about 50 ft near the southwest corner to about 470 ft at the southeast corner. It ranges in thickness from a featheredge along the line of complete erosion which extends across the central part of the county to about 100 ft at Yates City and about 120 ft at Abingdon. The yield capability of the Burlington aquifer depends on the number, size, and degree of interconnection of water-filled fractures within the rock that are intersected by the well bore. Quantities of water adequate for domestic and farm use usually can be obtained from this unit and, locally, supplies for small communities may be available for development, although the water is probably quite highly mineralized in the southeast corner of the county.

The next-lower interval in the Mississippi Valley Aquigroup consists of impermeable shales of the New Albany Group (Kinderhook Series-Mississippian age and Upper Devonian Series), which extend throughout Knox County except for a small area in the northwest corner where they have been eroded. These shales underlie the Pennsylvanian rocks in the north one-half of the county and the Burlington Limestone in the south one-half, separating the Burlington aquifer both physically and hydraulically from deeper water-yielding units. Their thickness ranges from a featheredge along the erosional lineament in the northwest corner to about 100 ft in the northeast area. They are about 190 to 285 ft thick in the southern portion of the county.

In the previously noted small area where the Burlington aquifer underlies the glacial drift, it constitutes the Upper Bedrock Aquigroup, and shale of the New Albany Group becomes the upper confining unit of the Mississippi Valley Aquigroup.

The basal part of the Mississippi Valley Aquigroup consists of limestone and dolomite of the Silurian and Devonian Systems (Hunton Megagroup) that occur below

the shales of the New Albany Group, except in a small area in the northwest corner of the county where they directly underlie the Pennsylvanian rocks. They lie at depths from about 250 ft at Galesburg to about 400 ft in the northwest area to as much as 700 ft in the southeast part of the county. They range in thickness from about 140 to 170 ft in the southwest quarter to about 300 to 350 ft in eastern and northern Knox County. Water from these carbonate units is obtained from cracks and crevices in the rock that are intersected by the well bore. The degree of fracture development is reportedly greater in the upper 125 ft of these units and is generally better than in the shallower Burlington aquifer. Small to possibly moderate-sized municipal supplies (50 to 100 gpm) can often be obtained. The water is highly mineralized.

Below the Mississippi Valley Aquigroup there is a series of hydrologically related units that make up the Midwest Aquigroup. The uppermost part is the Maquoketa Group (Ordovician age), which underlies the Silurian-Devonian aquifer and consists primarily of shales that yield little or no water. It is about 80 to 210 ft thick, has very low permeability, and acts as an aquitard between the Silurian-Devonian aquifer and deeper water-yielding units.

Below the Maquoketa Group a thick sequence of rock units forms the water-yielding portion of the Midwest Aquigroup, formerly known as the Cambrian-Ordovician aquifer system. These rock units are, in downward order, dolomites of the Galena and Platteville Groups; Glenwood-St. Peter Sandstone (Ansell aquifer); Prairie du Chien Group (Shakopee, New Richmond, Onkota, and Gunter Formations); Eminence-Potosi Dolomite; Franconia Formation; and Ironton-Galesville Sandstone. Water supply wells in Knox County have not penetrated units below the Ironton-Galesville Sandstone.

The top of the Galena Group (Ordovician age) lies at depths ranging from about 700 ft at Galesburg to about 1100 ft at Yates City. The Galena and Platteville Groups have a thickness that ranges from about 275 to 375 ft. Water from these units is also obtained from cracks and crevices intersected by the well bore. Moderate quantities of water (50 to 200 gpm) usually are obtained, but the water is highly mineralized.

The Ansell aquifer, consisting of the Glenwood-St. Peter Sandstone (Ordovician age), lies below the Galena-Platteville at depths ranging from about 1075 ft in the west-central area to about 1425 ft in the southeast region near Yates City. The limited data available suggest that the aquifer is about 140 to 210 ft thick in Knox County. The Ansell is one of the more reliable aquifers in northern Illinois and is capable of yielding moderate quantities of water. The water is highly mineralized in this area.

Below the Glenwood-St. Peter lie the Prairie du Chien Group (Ordovician age), the Eminence-Potosi Dolomite (Cambrian age), and the Franconia Formation. Together they form the Middle Confining Unit in the Midwest Aquigroup, consisting of interbedded sandstones, shales, and dolomites. These units are encountered at depths from about 1225 ft in the west-central area to about 1575 ft in the southeast and have a total thickness of about 990 to 1055 ft. The shales and dolomites yield little water, but the sandy parts of these units may contribute small to moderate quantities of highly mineralized water.

The Ironton-Galesville Sandstone (Cambrian age) is the most consistently permeable and productive aquifer of the Midwest Aquigroup in northern Illinois. It is capable of yielding moderate to large quantities (several hundred gpm) of highly mineralized water in Knox County. It lies at depths of about 2200 to 2500 ft and is about 110 to 200 ft thick.

GROUND-WATER DEVELOPMENT FOR PUBLIC USE

Ground water is used as a source for public water supplies at Abingdon, Altona, Blake Water Corporation, Central Illinois Utility Co., East Galesburg, Galesburg, Henderson, Knoxville, Maquon, Onaida, Rio, St. Augustine, Victoria, Wataga, Westport Water Mutual, Williamsfield, Windwood Water System, Inc., and Yates City. The locations of these supplies are shown in figure 2.

Sand and gravel deposits in the drift of the Prairie Aquigroup and sandstone, siltstone, and fractured shale in the upper part of the Upper Bedrock Aquigroup (Pennsylvanian System) are tapped as a partial source of water for Yates City. There is presently 1 emergency well finished in these aquifer units at a depth of 94 ft, with a reported pumping rate of 125 gpm. Analyses of water samples from the well indicate that the iron content ranges from a trace

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to 0.7 mg/L and the hardness from 290 to 370 mg/L. Water from this well is not treated.

The Pennsylvanian sandstone, siltstone, and fractured shale of the Upper Bedrock or Mississippi Valley Aquigroups are a source of water for Westport Water Mutual and Windwood Water System, Inc., and a partial source of water for St. Augustine. There are presently 3 production wells, 87, 150 and 170 ft deep, open only to the Pennsylvanian rocks. Their pumps are reportedly rated from about 20 to 52 gpm. Production from these wells in 1986 was estimated to be about 20,200 gpd. Analyses of water from these wells indicate that the hardness ranges from 275 to 340 mg/L. The iron content of water from the 2 wells in the west-central part of the county ranges from 0.27 to 0.73 mg/L. The iron content of water from St. Augustine Well No. 2, located in the southwest corner of the county, ranges from 4.57 to 7.49 mg/L. Water from Westport Water Mutual is fluoridated; water from St. Augustine Well No. 2 is filtered; and water from the Windwood Water System, Inc., is not treated.

The Burlington aquifer of the Mississippi Valley Aquigroup is used as a partial source of water for St. Augustine. There is presently 1 production well, 170 ft deep, open only to the Burlington. It is reportedly pumped at a rate of about 20 gpm. Production from this well in 1986 was estimated to be about 6100 gpd. Analyses of water samples show that the iron content ranges from 4.5 to 9.80 mg/L and the hardness from 266 to 290 mg/L. Water from St. Augustine Well No. 1 is aerated to oxidize iron, chlorinated, and filtered.

Deeper bedrock aquifers are tapped for water supplies at Abingdon, Altona, Blake Water Corporation, Central Illinois Utility Co., Galesburg, Henderson, Knoxville, Maquon, Oneida, Rio, Victoria, Wataga, Williamsfield, and Yates City. These wells are open to various combinations of aquifers in the Mississippi Valley and Midwest Aquigroups (Pennsylvanian, Mississippian, Devonian, Silurian, Ordovician, and Cambrian age units), with each contributing a portion of the water withdrawn. Water obtained from many of these bedrock units in Knox County is highly mineralized, with one or more mineral constituents exceeding the primary or secondary standards of the USEPA Interim Drinking-Water Regulations. Fluoride, radium, sulfate, chloride, and total mineral content are among the constituents that may be greater than the allowable or recommended limit. Sufficient data are not available to determine the specific aquifer unit that contributes water with the greatest concentrations of each mineral constituent.

The Mississippi Valley Aquigroup (Devonian and Silurian Systems) is tapped as a source at Altona, Blake

Water Corporation, Central Illinois Utility Co., Henderson, Oneida Well No. 1, Rio, Victoria, and Williamsfield. There are presently 10 production and standby wells ranging in depth from 520 to 887 ft open only to the Devonian and Silurian aquifers, including the Altona well, which is open to the Silurian aquifer and the Midwest Aquigroup (Maquoketa Group). Their reported pumping rates range from 60 to 170 gpm. Production from these wells in 1986 was estimated to be about 236,750 gpd.

The wells at Maquon and Wataga are open to combinations of the Pennsylvanian, Burlington, Devonian, and Silurian aquifers. There are presently 2 production wells (one in each community), 638 and 840 ft deep, open to these units. They are reportedly pumped at rates of 62 and 140 gpm. Production from these wells in 1986 was estimated to be about 96,000 gpd.

Analyses of water from the Devonian and Silurian units individually, and in the various combinations at Maquon and Wataga, indicate that the iron content ranges from 0.0 to 1.46 mg/L, sodium from 288 to 760 mg/L, fluoride from 1.6 to 4.2 mg/L, chlorides from 68 to 570 mg/L, hardness from 21 to 112 mg/L, and total dissolved minerals from 771 to 1830 mg/L. Hydrogen sulfide gas was also noted in water from 7 wells. Water for Altona, Blake Water Corporation, Henderson, Maquon, Oneida, Victoria, Wataga, and Williamsfield is aerated to remove hydrogen sulfide, and is chlorinated; water for Central Illinois Utility Co. is chlorinated and filtered; and water for Rio is chlorinated.

Part of the Midwest Aquigroup (Galena and Platteville Groups and the Glenwood-St. Peter Sandstone) is tapped as a source of water by Knoxville Well No. 1 and Yates City Well No. 3. The wells, 1375 and 1580 ft deep, are reportedly pumped at rates of 175 and 250 gpm. Oneida Well No. 2 is open to the Galena-Platteville unit as well as the overlying Devonian and Silurian aquifers. This well is 1202 ft deep and is pumped at a rate of 150 gpm. Production in 1986 from these 3 wells was estimated to be about 167,500 gpd. Analyses of water indicate that the iron content generally ranges from 0.1 to 1.0 mg/L, sodium from 310 to 406 mg/L, fluoride from 1.0 to 3.0 mg/L, sulfates from 105 to 700 mg/L, hardness from 58 to 424 mg/L, and total dissolved minerals from 882 to 1619 mg/L. Water for Knoxville and Yates City Well No. 3 is chlorinated.

Combinations of aquifers within the Midwest Aquigroup (Cambrian-Ordovician aquifer system) are tapped for water supplies at Abingdon, Galesburg, and Knoxville. There are presently 7 production or standby wells, ranging in depth from 2408 to 2586 ft, finished within the Midwest

Aquigroup (including the Florence Ave. well at Galesburg, which is also open to the Devonian aquifer). Their reported pumping rates range from 300 to 1000 gpm. Production from these wells for 1986 was estimated to be about 665,700 gpd. Analyses of water indicate that the iron content ranges from a trace to 2.0 mg/L, sodium from 267.4 to 398.1 mg/L, fluoride from 1.4 to 4.0 mg/L, chlorides from 142.8 to 230 mg/L, sulfates from 250 to 579 mg/L, hardness from 210 to 385 mg/L, and total dissolved minerals from 990 to 1575 mg/L. Water for Abingdon is chlorinated.

The total municipal pumpage in Knox County in 1986 averaged about 1,192,250 gpd. Of this total, about 33 percent (392,300 gpd) was from wells finished in the Mississippi Valley and Upper Bedrock Aquigroups (Pennsylvanian, Burlington, and the Devonian and Silurian aquifers); about 11 percent (134,250 gpd) was from wells finished in the upper water-yielding part of the Midwest Aquigroup (Galena and Platteville unit or Ansell aquifer); and about 56 percent (665,700 gpd) was from wells tapping combinations of formations within the Midwest Aquigroup (Cambrian-Ordovician aquifer system).

FORMAT

In this publication the descriptions of public ground-water supplies are presented in alphabetical order by place name.

At the beginning of each description the U.S. Census of population for 1980 is given for incorporated places. For unincorporated places, population is estimated by the number of services or residential units and an assumed number of 3.5 persons per service.

The earliest and latest reported values for the number of services and quantity of water distributed at each supply are given where available.

Individual production wells for each supply are described in the order of their construction. The description for each well includes the *aquifer or aquifers tapped, date drilled, depth, driller, legal location, elevation in feet above mean sea level, log, construction features, yield, pumping equipment, and chemical analyses.*

When available, sample study logs prepared by the Illinois State Geological Survey are presented. When these

are not available, drillers logs are used as reported. Commonly used drillers terms such as clay, silt, or pebbly clay generally are synonymous with the glacial tills tabulated by the State Geological Survey. Most of the limestones or dolomites reported by drillers that yield fresh water in Illinois are carbonate rocks, dolomitic in composition. When the bedrock aquifers tapped by a well are described, the sample study log provided by the State Geological Survey and the drillers casing record are used to determine the hydrostratigraphic units open to the well. If only a drillers log is available and the hydrostratigraphic units cannot be readily determined, only the principal rock type as described by the driller is given (dolomite, sandstone, etc.).

The screen sizes given in this publication are for continuous slot type screens. Slot sizes given indicate the width of the slot openings in thousandths of an inch. For example, a 20-slot screen has slot openings 0.020 in. wide, and a 100-slot screen has slots 0.100 in. wide.

EAST GALESBURG

The village of East Galesburg (928) installed a public water supply in 1950. Finished water for this supply is obtained from the city of Galesburg (see Galesburg). In

1952 the average consumption was 10,750 gpd. In 1986 there were 313 services; the average consumption was 58,400 gpd.

GALESBURG

The city of Galesburg (35,305) installed a public water supply in 1890. Although this city is located in Knox County, the last four wells constructed are located in Henderson County. Four wells (Collector No. 1, and Well Nos. 74-1, 74-2, and 74-3) are in use and three wells (Henderson St. Well Nos. 1 and 2, and Florence Ave. well)

are available for emergency use. Galesburg also furnishes water to the village of East Galesburg. In 1952 the average and maximum pumpages were 1,150,000 and 1,400,000 gpd, respectively. In 1986 there were 12,653 services, all metered (including East Galesburg); the average pumpage was 5,396,500 gpd. The water is chlorinated, and then

pumped to the treatment plant in Galesburg where it is fed a polyelectrolyte coagulant aid (Nalcolyte 110-A), filtered, and fluoridated.

Initially, water was obtained from a series of driven wells 70 to 80 ft deep located along the bank of Cedar Creek near the old waterworks building in the city of Galesburg. Additional wells were drilled as needed until there were about 80. In 1911, with five 8-in. wells and one 10-in. well in use, all about 70 ft deep, the nonpumping water level was reported to be 45 to 50 ft below land surface. The wells were equipped with Cook strainers about 20 ft long with 1/16-in. openings. By 1921, continuous sand problems caused abandonment of these wells.

Two wells were drilled in the same vicinity as the driven wells in January and September 1896 to depths of 1226 and 1250 ft, respectively. In 1906 another well was drilled to a depth of 775 ft in the same part of the city. Non-pumping water levels were reported to be 100 ft below land surface in 1911 and 180 ft in 1920. In 1921, it was reported that these deep wells were not being used because their operation was not economical compared to the operation of the three wells that were drilled in 1917 and 1919. These wells were abandoned prior to 1929.

1226-FT DEEP WELL, DRILLERS LOG

<i>Strata</i>	<i>Thickness (ft)</i>	<i>Depth (ft)</i>
Black top soil	4	4
Blue clay	8	12
Fine sand	13	25
Sand	13	38
Coal	2	40
Coarse sand and gravel	45	85
Fire clay	5	90
Sandstone	15	105
Shale mixed with sand	27	132
Sandstone	6	138
Fire clay	4	142
Black shale	8	150
White shale	15	165
Brown shale	10	175
Soapstone	15	190
Black soapstone	10	200
Limestone and flint	15	215
Slate	15	230
Yellow shale	115	345
Limestone	80	425
White limestone	25	450
Sandstone	110	560
Shale, soapstone and limestone	90	650
Limestone	25	675
Black limestone	85	760
Trenton limestone	300	1060
St. Peter sandstone	166	1226

A large-diameter well, 9 ft in diameter, was constructed in 1914 to a depth of about 80 ft. The well was cased

with 6-ft diameter steel pipe to a depth of 60 ft followed by two concentric perforated pipes, with an 18-in. space between which was filled with gravel. This well was abandoned in 1920.

CENTRAL FIRE STATION WELL (also known as Bradley Well No. 1) was completed in December 1917 to a depth of 1252 ft by city employees. This well was abandoned prior to 1952 and has been sealed. The water-yielding unit penetrated in this well before abandonment was the Midwest Aquigroup (Glenwood-St. Peter Sandstone). The well was located at the Central Fire Station on the east side of Cherry St. south of Simmons St., approximately 500 ft S and 1280 ft W of the NE corner of Section 15, T11N, R1E, Knox County. The land surface elevation at the well is 772.78 ft.

CENTRAL FIRE STATION WELL, PARTIAL SAMPLE STUDY LOG

(furnished by the State Geological Survey)

<i>Strata</i>	<i>Thickness (ft)</i>	<i>Depth (ft)</i>
QUATERNARY SYSTEM		
Pleistocene Series		
Till, pebbly and sandy	at	54
Sand, quartz grains, with a piece of coal	at	96
Sand and gravel	at	98
PENNSYLVANIAN SYSTEM		
Des Moinesian and Atokan Series		
Coal and black sandy shale	at	110
Shale, gray, with fine sand	at	215
Shale and fine sand, gray	at	260
DEVONIAN SYSTEM		
Middle Devonian Series		
Cedar Valley-Wapsipinicon Limestone		
Limestone, gray, shaley	5	410
Interval	5	415
Limestone, like last	5	420
Limestone, gray, with a little sand	5	425
Limestone, gray, fine grained	10	435
Limestone, light brownish gray, fine grained	25	460
SILURIAN SYSTEM		
Niagaran and Alexandrian Series		
Limestone, like last, mixed with dolomite, light gray	5	465
Limestone, light to drab, crystalline	39	504
Limestone, gray	11	515
Limestone, gray, subcrystalline	5	520
Limestone, light gray, subcrystalline, partly dolomitic	5	525
Dolomite, gray	50	575
ORDOVICIAN SYSTEM		
Cincinnatian Series		
Maquoketa Group		
Dolomite, gray, with some chert	5	580
Shale, greenish gray	29	609
Shale, light gray	57	666

<i>Strata</i>	<i>Thickness (ft)</i>	<i>Depth (ft)</i>
Limestone, shaley, dolomitic, subcrystalline	14	680
Shale, gray	5	685
Limestone, dolomitic, subcrystalline	6	691
Limestone, gray and drab, partly dolomitic	17	708
Shale, gray, calcareous	10	718
Champlainian Series		
Galena and Platteville Groups		
Limestone, gray to drab, dolomitic, fine grained, shows HCl action	62	780
Dolomite, gray, crystalline	6	786
Limestone, gray, dolomitic, shows HCl action	206	992
Limestone, dolomitic with some chert	5	997
Limestone, dolomitic, gray	83	1080
Limestone, dolomitic, gray with some sand	10	1090
Ancell Group		
Glenwood-St. Peter Sandstone		
Sand, quartz, in clean rounded grains	10	1100
Sand, like the last with some dolomite from above	6	1106
Sand, yellowish, in rounded grains	46	1152
Sandstone with gray dolomite cement	at	1180
Sandstone, like last	5	1185
Sandstone, with gray (light) dolomitic cement	20	1205
Sandstone, with gray dolomite cement	35	1240
Sandstone, in clean rounded quartz grains	12	1252

The well was cased with 24-in. heavy steel pipe from land surface to a depth of 40 ft, 20-in. heavy steel pipe from 40 ft to a depth of 146 ft, 16-in. heavy steel pipe from 146 ft to a depth of 276 ft, 12-in. heavy steel pipe from 276 ft to a depth of 626 ft, and 10-in. wrought iron pipe from 626 ft to a depth of 1087 ft. Below the casing, the hole was 10 in. in diameter to the bottom.

The well was shot with two 200-lb charges of 100 percent gelatin and then cleaned out.

In 1921, it was reported that after pumping at a rate of 450 gpm, the drawdown was 118 ft from a nonpumping water level of 186 ft below land surface.

A mineral analysis of a sample (Lab. No. 99153) collected February 11, 1944, after pumping for 30 min at 210 to 225 gpm, showed the water to have a hardness of 501 mg/L, total dissolved minerals of 1885 mg/L, and an iron content of 0.6 mg/L.

BROOKS ST. WELL (also known as Bradley Well No. 2) was constructed in 1919 to a depth of 1245 ft by city employees and deepened in July 1944 to a reported depth of 2450 ft by the Thorpe Well Drilling Co., Des Moines, Iowa. This well was abandoned and sealed in 1986. The water-yielding unit in this well was the Midwest Aquigroup (Cambrian-Ordovician aquifer) except for dolomites of

the Galena and Platteville Groups and the Glenwood-St. Peter Sandstone. The well also penetrated the upper part of the Basal Bedrock Aquigroup (Eau Claire Formation), but its contribution to the well was probably negligible. The well was located at the southeast corner of Brooks St. and Churchill Ave., approximately 2325 ft S and 900 ft E of the NW corner of Section 14, T11N, R1E, Knox County. The land surface elevation at the well is 782.7 ft.

BROOKS ST. WELL, INTERPRETED DRILLERS LOG

(furnished by the State Geological Survey)

<i>Strata</i>	<i>Thickness (ft)</i>	<i>Depth (ft)</i>
QUATERNARY SYSTEM		
Pleistocene Series		
Glacial drift		
Till and clay, yellow to gray	20	20
Sand and gravel	32	52
PENNSYLVANIAN SYSTEM		
Des Moinesian and Atokan Series		
Shale, light gray	68	120
Shale, dark gray, calcareous	15	135
Shale, light gray, with coal	5	140
Sandstone, gray, reddish	20	160
Sandstone, calcareous, gray, shale, gray	9	169
Limestone, sandy, gray; shale, sandy	9	178
Shale, black; limestone, dark	12	190
Coal; underclay	5	195
Shale, black; limestone, black	20	215
Shale, gray to brown	35	250
Shale, sandy, gray	5	255
Sandstone, brown; little shale	15	270
DEVONIAN SYSTEM		
Upper Devonian Series		
New Albany Group		
Shale, gray to brown, sporangites	60	330
Middle Devonian Series		
Cedar Valley-Wapsipinicon Limestone		
Limestone, and dolomite, partly cherty	75	405
Limestone, gray, fine	60	465
SILURIAN SYSTEM		
Niagaran and Alexandrian Series		
Dolomite, gray, little shale, green	20	485
ORDOVICIAN SYSTEM		
Cincinnatian Series		
Maquoketa Group		
Shale, gray; dolomite, sandy	10	495
Dolomite, slightly cherty, gray	75	570
Shale, gray	5	575
Dolomite, gray	15	590
Shale, calcareous, gray	10	600
Dolomite, shaley, gray	10	610
Shale, gray to green	15	625
Dolomite, brown	5	630
Shale, calcareous, gray to brown	15	645
Dolomite, shaley, gray	10	655
Cincinnatian and Champlainian Series		
Galena and Platteville Groups		
Dolomite, gray	285	940
Dolomite, cherty, gray	25	965
Dolomite, gray	95	1060
Dolomite, sandy, gray	5	1065

Strata	Thickness (ft)	Depth (ft)
Ancell Group		
Glenwood-St. Peter Sandstone		
Sandstone, clean	165	1230
No record	22	1252
Canadian Series		
Prairie du Chien Group		
Shakopee Dolomite		
Dolomite, argillaceous in part	222	1474
New Richmond Sandstone		
Sandstone, cherty, dolomitic	46	1520
Dolomite, sandy, cherty, sandstone	15	1535
Oneota Dolomite		
Dolomite	15	1550
Dolomite, cherty, white; sandstone	5	1555
Dolomite, with interbedded sandstone	25	1580
Dolomite, cherty, white; sandstone	5	1585
Dolomite, cherty	15	1600
Dolomite, white	10	1610
Dolomite, cherty, sandy at base	55	1665
Dolomite, very cherty, white; quartz	5	1670
Dolomite, cherty, sandy	25	1695
Dolomite, buff, pink	10	1705
Dolomite, cherty, silty	30	1735
Dolomite, cherty, sandy, shaley, buff	15	1750
Chert, dolomitic, oolitic	5	1755
Dolomite, sandy, interbedded sandstone	15	1770
Dolomite, sandy, cherty (oolitic), buff	5	1775
Dolomite sandy, sandstone	18	1793
CAMBRIAN SYSTEM		
St. Croixan Series		
Eminence-Potosi Dolomite		
Dolomite, sandy, glauconitic	17	1810
Crevice	5	1815
Dolomite, sandy, cherty, glauconitic; quartz	5	1820
Dolomite	30	1850
Dolomite, sandy, glauconitic	20	1870
Dolomite; crevice at base	10	1880
Dolomite, gray, pink; quartz	20	1900
Dolomite; crevices	20	1920
Dolomite, glauconitic, buff; quartz	40	1960
Same; thin sandstone beds	20	1980
Dolomite, sandy, glauconitic, buff; quartz	25	2005
Dolomite	10	2015
Dolomite, sandy, glauconitic, buff, pink	40	2055
Dolomite	11	2066
Franconia Formation		
Dolomite, sandy, glauconitic	9	2075
Dolomite, very glauconitic and sandy; shale	90	2165
Sandstone, white, coarse, incoherent	20	2185
Dolomite, as above; shale	55	2240
Iron-ton-Galesville Sandstone		
Sandstone, dolomitic	50	2290
Sandstone, slightly dolomitic, buff	55	2345
Sandstone, buff; thin dolomite beds	50	2395
Sandstone, buff	20	2415
Sandstone	21	2436
Eau Claire Formation		
Sand; some green, red, and gray shale	14	2450

Originally, the well was cased with 20-in. pipe from land surface to a depth of 52 ft, 16-in. OD pipe from land surface to a depth of 360 ft (cemented in), and 15-in. OD pipe from 360 ft to a depth of 610 ft. Below the casing, the hole was finished 14 in. in diameter to a depth of 1245 ft. During deepening in 1944, the well was cased with 12-in. wrought iron pipe from land surface to a depth of 319.7 ft, 10-in. wrought iron pipe from 319.7 ft to a depth of 569.2 ft, and 8-in. drive pipe from land surface to a depth of 1259.5 ft (the top 522 ft was cut off and removed). Below the casing, the hole was finished 8 in. in diameter to the bottom. The annulus between the old 16- and the new 12-in. casings and between the old 14- and the new 10-in. casings was filled with cement grout.

A production test was conducted by the driller on March 8, 1919. After pumping at a rate of 650 gpm, the drawdown was 157 ft from a nonpumping water level of 190 ft below land surface.

In November 1943, a 1.5-in. airpipe broke causing air and water to rise outside the eductor pipe and flood the station. The Thorpe Well Drilling Co. removed the pump and the nonpumping water level was reported to be 253 ft below the top of the 16-in. casing. It was observed that at a depth of 60 ft, considerable water was entering the well through holes in the casing. The holes may have been made when the well was first constructed in order to take advantage of the water found at that depth. In 1944 the driller deepened the well to 2450 ft and installed new casings.

After the well was deepened, a production test was conducted by the State Water Survey on July 14, 1944. After 8.4 hr of pumping at rates of 512 to 519 gpm, the final drawdown was 19 ft from a nonpumping water level of 258 ft below land surface. One min after pumping was stopped, full recovery was observed.

A partial analysis of a sample (Lab. No. 105558), collected February 15, 1946, after pumping for 6.1 hr, showed the water to have a hardness of 318 mg/L, total dissolved minerals of 1352 mg/L, and an iron content of 1.6 mg/L.

HENDERSON ST. WELL NO. 1 (also known as Potsdam Well No. 1) was completed in July 1919 to a depth of 2414 ft by S. B. Geiger, Chicago. This well is available for emergency use. The water-yielding unit in this well is the Midwest Aquigroup (Cambrian-Ordovician aquifer) except for dolomites of the Galena and Platteville Groups and the Glenwood-St. Peter Sandstone. The well is located about 200 ft south of the waterworks pumping station and 550 ft west of Henderson St., approximately 540 ft S and 640 ft W of the NE corner of Section 16,

T11N, R1E, Knox County. The land surface elevation at the well is approximately 760 ft.

HENDERSON ST. WELL NO. 1, SAMPLE STUDY LOG
(furnished by the State Geological Survey)

<i>Strata</i>	<i>Thickness (ft)</i>	<i>Depth (ft)</i>
QUATERNARY SYSTEM		
Pleistocene Series		
No samples	50	50
Sand, brownish gray, medium grained, calcareous below	10	60
No samples	20	80
Sand, brownish gray, fine to coarse, calcareous	5	85
No samples	10	95
PENNSYLVANIAN SYSTEM		
Des Moinesian and Atokan Series		
Shale, calcareous, medium gray, silty	50	145
Coal; and shale, medium gray, sandy	5	150
Shale, medium gray	20	170
No samples	20	190
Coal; and fire clay, light gray, soft	10	200
Shale, dark gray, soft	5	205
No samples	25	230
Shale, slightly calcareous, brown, sandy	5	235
No samples	10	245
DEVONIAN SYSTEM		
Upper Devonian Series		
New Albany Group		
Shale, light gray and brown, smooth	20	265
Shale, brown and gray, slightly gritty, with sporangites huronense fossils	55	320
Middle Devonian Series		
Cedar Valley-Wapsipinicon Limestone		
Limestone, argillaceous, light brownish gray, fossiliferous	5	325
No samples	105	430
SILURIAN SYSTEM		
Niagaran and Alexandrian Series		
Chert, white and gray, oolitic and banded, some weathered	5	435
No samples	10	445
Dolomite, light gray, powdered	5	450
SILURIAN AND ORDOVICIAN SYSTEMS (Undifferentiated)		
No samples	350	800
ORDOVICIAN SYSTEM		
Champlainian Series		
Galena and Platteville Groups		
Dolomite, brown, finely crystalline; lower 10 ft sandy	255	1055
Ancell Group		
Glenwood-St. Peter Sandstone		
Sandstone, white, fine to medium	135	1190
Chert pebbles, white and buff, dense, oolitic, and porous; with sandstone	35	1225
Shale, green, sandy	5	1230
Canadian Series		
Prairie du Chien Group		
Shakopee Dolomite		

<i>Strata</i>	<i>Thickness (ft)</i>	<i>Depth (ft)</i>
Dolomite, gray, buff and pink, with cherty and sandy layers	205	1435
Dolomite, light brown, with whitish chert	50	1485
New Richmond Sandstone		
Sandstone, dolomitic, very fine to medium (New Richmond?)	15	1500
Oneota Dolomite		
Dolomite, cherty, light gray to white	225	1725
Gunter Sandstone		
Dolomite, cherty, white, sandy; with sandstone, white, fine	10	1735
CAMBRIAN SYSTEM		
St. Croixian Series		
Eminence-Potosi Dolomite		
Dolomite, light gray and pink, very fine grained	285	2020
Dolomite, light brownish gray, glauconitic	10	2030
Franconia Formation		
Sandstone, very dolomitic, gray with greenish tint, glauconitic, very fine grained	130	2160
Dolomite, sandy, gray, scattered glauconite	30	2190
Sandstone, dolomitic, gray, glauconitic, becoming coarser at bottom	25	2215
Shale, yellow green, powdered and mixed with sand	20	2235
Iron-ton-Galesville Sandstone		
Sandstone, white to yellow, fine to medium, loosely cemented	70	2305
Interval not studied	109	2414

A 26-in. diameter hole was drilled to a depth of 573 ft, reduced to 16 in. between 573 and 1225 ft, reduced to 12 in. between 1225 and 2100 ft, reduced to 11 in. between 2100 and 2175 ft, and finished 10 in. in diameter from 2175 to 2414 ft. The well is cased with 26-in. OD drive pipe from land surface to a depth of 125 ft, 22-in. OD pipe from land surface to a depth of 201.3 ft, and 16-in. OD pipe from 201.3 ft to a depth of 1225 ft.

Nonpumping water levels below the pump base plate were reported as follows: 156 ft in 1919; 205.5 ft in March 1936; 245.1 ft on October 18, 1939; and 247.5 ft on July 2, 1945.

The pumping equipment presently installed is a 12-in., 18-stage National Pump Co. vertical turbine pump set at 448 ft, rated at 1000 gpm, and powered by a 150-hp, 1160 rpm Westinghouse electric motor (No. 4649281). A 10-ft section of suction pipe is attached to the pump intake.

A mineral analysis of a sample (Lab. No. 105243) collected January 9, 1946, showed the water to have a hardness of 229 mg/L, total dissolved minerals of 1026 mg/L, and an iron content of 0.3 mg/L.

HENDERSON ST. WELL NO. 2 (also known as Potsdam Well No. 2) was completed in June 1928 to a depth of 2408 ft by the Phillips Bros., Des Moines, Iowa. This well is available for emergency use. The water-yielding unit in this well is the Midwest Aquigroup (Cambrian-Ordovician aquifer) except: dolomites of the Galena and Platteville Groups, the Glenwood-St. Peter Sandstone, and the Shakopee Dolomite. The well also penetrates the upper part of the Basal Bedrock Aquigroup (Eau Claire Formation), but its contribution to the well is probably negligible. The well is located on the west side of Henderson St. about 500 ft east of the waterworks station, approximately 390 ft S and 140 ft W of the NE corner of Section 16, T11N, R1E, Knox County. The land surface elevation at the well is 756.3 ft.

HENDERSON ST. WELL NO. 2, SUMMARY SAMPLE STUDY LOG
(furnished by the State Geological Survey)

<i>Strata</i>	<i>Thickness (ft)</i>	<i>Depth (ft)</i>
QUATERNARY SYSTEM		
Pleistocene Series		
Glacial drift		
Soil and till	20	20
Sand, yellow	55	75
Till, gray	10	85
PENNSYLVANIAN SYSTEM		
Des Moinesian and Atokan Series		
Shale, black	5	90
Coal	5	95
Shale, gray to black	135	230
MISSISSIPPIAN AND DEVONIAN SYSTEMS		
Kinderhookian and Upper Devonian Series		
New Albany Group	125	355
DEVONIAN SYSTEM		
Middle Devonian Series		
Cedar Valley-Wapsipicon Limestone	90	445
SILURIAN SYSTEM		
Niagaran and Alexandrian Dolomite Series	125	570
ORDOVICIAN SYSTEM		
Cincinnatian Series		
Maquoketa Shale Group	200	770
Champlainian Series		
Galena and Platteville Dolomite Groups	300	1070
Ansell Group		
Glenwood-St. Peter Sandstone		
Sandstone	135	1205
Shale, weak	5	1210
Canadian Series		
Prairie du Chien Group		
Shakopee Dolomite	270	1480
New Richmond Sandstone	40	1520
Oneota Dolomite	255	1775
No samples	40	1815
CAMBRIAN SYSTEM		
St. Croixian Series		
Eminence-Potosi Dolomite	205	2020
Franconia Formation		
Dolomite, sandstone and shale	195	2215
Ironton-Galesville Sandstone	120	2335
Eau Claire Formation		
Some sandstone, dolomite, and shale	73	2408

The well is cased with 22-in. OD pipe from land surface to a depth of 412 ft and 14-in. OD pipe from 406 ft to a depth of 1479 ft. Below the casing, the hole was finished 12 in. in diameter to the bottom.

Upon completion, the well reportedly produced 1600 gpm with a drawdown of 57 ft from a nonpumping water level of 197 ft below the base plate.

In June 1933, after pumping at a rate of 1580 gpm, the drawdown was 39.1 ft from a nonpumping water level of 202.5 ft below the base plate.

Nonpumping water levels below the base plate were reported to be 211 ft in May 1936 and 222 ft in February 1940.

In June 1944, the well reportedly produced 1000 gpm with a drawdown of 74.3+ ft from a nonpumping water level of 230.9 ft below the base plate.

The pumping equipment presently installed is a 14-in., 10-stage National Pump Co. vertical turbine pump set at 397 ft, rated at 1000 gpm at about 390 ft TDH, and powered by a 200-hp, 1176 rpm Westinghouse electric motor (No. 154C3947). A 10-ft section of suction pipe is attached to the pump intake.

A mineral analysis of a sample (Lab. No. 105245) collected January 9, 1946, showed the water to have a hardness of 227 mg/L, total dissolved minerals of 1086 mg/L, and an iron content of 0.1 mg/L.

In May and June 1944, during a critical water shortage, the city leased an 80-ft deep well from the Western Illinois Ice Co. The well was located on the south side of the Atchison, Topeka, and Santa Fe RR Co. right of way and 500 ft west of Main St., approximately 300 ft S and 1125 ft E of the NW corner of Section 15, T11N, R1E, Knox County. The well was reported to be 16 ft in diameter and cased with 15-ft diameter concrete pipe to a depth of 80 ft. On June 4, 1944, after pumping continuously at a rate of 400 gpm, there was very little drawdown from a nonpumping water level of 15 ft below land surface.

FLORENCE AVE. WELL was completed in June 1944 to a depth of 2473 ft by the Thorpe Well Drilling Co., Des Moines, Iowa. This well is available for emergency use. The water-yielding units in this well are limestone of the Mississippi Valley Aquigroup (Devonian System) and the Midwest Aquigroup (Cambrian-Ordovician aquifer) except for the Platteville Group and the Glenwood-St. Peter Sandstone. The well also penetrates the upper part of the Basal Bedrock Aquigroup (Eau Claire Formation). The well is located 500 ft west of Florence Ave. and 160 ft south of Walsh St., approximately 2500 ft N and 1500 ft E of the SW corner of Section 2, T11N, R1E, Knox County.

The land surface elevation at the well is approximately 786 ft

FLORENCE AVE. WELL, SAMPLE STUDY LOG
(furnished by the State Geological Survey)

Strata	Thickness (ft)	Depth (ft)
QUATERNARY SYSTEM		
Pleistocene Series		
Soil, silt and till	25	25
Gravel, sand and silt	9	34
Till	41	75
Sand and gravel	7	82
PENNSYLVANIAN SYSTEM		
Des Moinesian and Atokan Series		
Shale, thin siltstone, limestone and coal beds	256	338
MISSISSIPPIAN AND DEVONIAN SYSTEMS		
Kinderhookian and Upper Devonian Series		
New Albany Group		
Shale, thin sandstone bed	40	378
DEVONIAN SYSTEM		
Middle Devonian Series		
Cedar Valley Limestone	80	458
Wapsipinicon Limestone	32	490
SILURIAN SYSTEM		
Niagaran and Alexandrian Series		
Siltstone and dolomite	64	554
Dolomite	68	622
ORDOVICIAN SYSTEM		
Cincinnatian Series		
Maquoketa Group		
Shale, some dolomite	198	820
Champlainian Series		
Galeua and Platteville Dolomite Groups	295	1115
Ancell Group		
Greenwood-St. Peter Sandstone		
Sandstone, dolomite and shale	5	1120
Sandstone, incoherent	143	1263
Shale and chert	10	1273
Canadian Series		
Prairie du Chien Group		
Shakopee Dolomite, some shale and thin sandstone beds	232	1505
New Richmond Sandstone, dolomitic	80	1585
Oneota Dolomite, some thin sandstone and shale beds	267	1852
CAMBRIAN SYSTEM		
St. Croixian Series		
Eminence-Potosi Dolomite	231	2083
Franconia Formation, dolomite, sandstone, thin shale bed	187	2270
Ironton-Galesville Sandstone, partly dolomitic	120	2390
Eau Claire Formation, sandstone, shale, thin dolomite bed	83	2473

A 24-in. diameter hole was drilled to a depth of 410 ft, reduced to 23 in. between 410 and 843 ft, reduced to 18 in. between 843 and 1285 ft, and finished 12 in. in diameter from 1285 to 2473 ft. The well is cased with 24-in. OD pipe from land surface to a depth of 410 ft, 16-in. OD liner pipe from 477.2 ft to a depth of 843.3 ft, and 12-in. ID liner pipe from 1031.5 ft to a depth of 1285.1 ft.

The hole was dynamited in two series of shots. The first series of 9 shots (125 lb each) was spaced between depths of 2278 and 2392 ft, and the second series of 5 shots (175 lb each) was spaced between depths of 2293 and 2402 ft.

A production test was conducted on June 2-4, 1944, by representatives of the driller and the State Water Survey. After 8.9 hr of pumping at rates of 470 to 483 gpm, the drawdown was 83 ft from a nonpumping water level of 255 ft below the top of the 24-in. casing. Pumping was continued for 6.2 hr at rates ranging from 718 to 558 gpm with a maximum drawdown of 121 ft. After a 2.2-hr shutdown, pumping was resumed for 5.8 hr at rates of 773 to 700 gpm with a drawdown of 136 ft. After a 45-min shutdown, pumping was resumed for 11 hr at rates of 718 to 700 gpm with a drawdown of 140 ft. After another 5.5-hr shutdown, pumping was resumed for 10.6 hr at rates ranging from 800 to 718 gpm with a drawdown of 155 ft. After a 40-min shutdown, the well was pumped for 7.8 hr at rates ranging from 663 to 635 gpm with a final drawdown of 130 ft.

In November 1955, the nonpumping water level was reported to be 300 ft below land surface.

The pumping equipment presently installed is an 11-in., 9-stage American Well Works turbine pump (No. 68796) rated at 1000 gpm at about 466 ft head, and powered by a 150-hp, 1770 rpm U. S. electric motor (Serial No. 326809). A 20-ft section of 10-in. suction pipe is attached to the pump intake.

The following mineral analysis (Lab. No. 105246) is for a water sample from the well collected January 9, 1946, after 10 days of pumping at 650 gpm.

FLORENCE AVE. WELL, LABORATORY NO. 105246

mg/L me/L				mg/L me/L	
Iron	Fe	0.5	Silica	SiO ₂	10.5
Manganese	Mn	0.0	Fluoride	F	3.0 0.16
Ammonium	NH ₄	1.3	Nitrate	NO ₃	1.2 0.02
Sodium	Na	382.5	Chloride	Cl	215.0 6.06
Calcium	Ca	68.1	Sulfate	SO ₄	558.9 11.62
Magnesium	Mg	26.2	Alkalinity (as CaCO ₃)		228 4.56
Turbidity	Tr		Hardness (as CaCO ₃)		279 5.58
Color	Tr				
Odor	0		Total dissolved		
Temp.	68.2F(reported)		minerals		1399

FOURTH ST. WELL was completed in 1950 to a depth of 2750 ft (plugged back to 2645 ft) by the Thorpe Well Drilling Co., Des Moines, Iowa. This well has not been used since 1966 and has been abandoned and capped. The water-yielding units in this well before abandonment were limestone and dolomite of the Mississippi Valley Aquifer group (Devonian and Silurian Systems), the Midwest

Aquigroup (Cambrian-Ordovician aquifer) except for the Glenwood-St. Peter Sandstone, and the Basal Bedrock Aquigroup (Eau Claire Formation). Before the well was plugged back to 2645 ft, it also penetrated the lower part of the Basal Bedrock Aquigroup (Mt. Simon Sandstone). The well is located about 350 ft west and 50 ft north of the intersection of Fourth and Henderson Sts., approximately 590 ft N and 350 ft W of the SE corner of Section 16, T11N, R1E, Knox County. The land surface elevation at the well is approximately 775 ft.

FOURTH ST. WELL, DRILLERS LOG

<i>Strata</i>	<i>Thickness (ft)</i>	<i>Depth (ft)</i>
Drift	96	96
Shale	19	115
Slate and coal	2	117
Shale	57	174
Coal	2	176
Shale	48	224
Limestone, sandy	14	238
Shale	159	397
Limestone	250	647
Shale	48	695
Limestone	19	714
Shale	7	721
Limestone	78	799
Shale	6	805
Limestone	5	810
Shale	5	815
Limestone	6	821
Limestone, shale streaks	5	826
Limestone	266	1092
Sandstone (St. Peter)	135	1227
Shale	8	1235
Dolomite	128	1363
Shale	3	1366
Dolomite	699	2065
Dolomite, shale streaks	120	2185
Dolomite, hard	40	2225
Dolomite, shale streaks	30	2255
Sandstone (Galesville)	120	2375
Dolomite, hard	30	2405
Dolomite, sandy with shale streaks	60	2465
Dolomite, hard	63	2528
Shale, brown	8	2536
Dolomite, hard	6	2542
Shale, brown	9	2551
Dolomite	78	2629
Dolomite, sandy	21	2650
Sandstone (Mt. Simon)	100	2750

A 32-in. diameter hole was drilled to a depth of 471 ft, reduced to 23 in. between 471 and 1260 ft, reduced to 19 in. between 1260 and 2525 ft, reduced to 15 in. between 2525 and 2637 ft, and finished 12 in. in diameter from 2637 to 2750 ft. The well is cased with 32-in. pipe from within a concrete base that extends 0.8 ft above the pumphouse floor to a depth of 106 ft, 24-in. pipe from land surface to a depth of 471 ft (cemented in), 20-in. pipe from 621 ft to a depth of 840 ft (cemented in) and from 1078 ft to

a depth of 1260 ft, 16-in. pipe from 2382 ft to a depth of 2523 ft, and 12-in. perforated pipe from 2511 ft to a depth of 2637 ft.

A production test was conducted by the driller on September 6, 1950. After 5.8 hr of pumping at rates of 248 to 280 gpm, the drawdown was 104 ft from a nonpumping water level of 257 ft.

A production test was conducted by the driller on October 13-14, 1950. After 1.7 hr of pumping at rates of 500 to 485 gpm, the drawdown was 88.0 ft from a nonpumping water level of 259.0 ft. Pumping was continued for 55 min at a rate of 585 gpm with a drawdown of 109.0 ft. Pumping was continued for 4.2 hr at rates of 725 to 750 gpm with a drawdown of 139.5 ft. Pumping was continued for 2 hr at rates of 886 to 850 gpm with a drawdown of 166.0 ft. After an additional 12.5 hr of pumping at rates ranging from 1030 to 1134 gpm, the final drawdown was 218.5 ft.

After a permanent pump had been installed, a production test was conducted on September 20, 1951, by representatives of the city, the pump contractor, and the State Water Survey. After 4.1 hr of pumping at rates ranging from 1001 to 776 gpm, the final drawdown was 147 ft from a nonpumping water level of 271 ft.

A partial analysis of a sample (Lab. No. 147290) collected in August 1958, showed the water to have a hardness of 304 mg/L, total dissolved minerals of 1601 mg/L, and an iron content of 0.8 mg/L. Hydrogen sulfide was apparent when a previous sample was collected.

Prior to the construction of Collector Well No. 1, more than 35 test holes were drilled in 1956 and 1957 by the Layne-Western Co., Aurora, and The Ranney Co., Westerville, Ohio, in the Mississippi River valley near Oquawka in Henderson County.

COLLECTOR WELL NO. 1, finished in sand and gravel of the Prairie Aquigroup, was completed in February 1958 by The Ranney Co., Westerville, Ohio. This well was placed in service in May 1959. The collector well is located about 30.5 miles west of Galesburg south of Oquawka about 50 ft from the Mississippi River bank, approximately 750 ft S and 175 ft W of the NE corner of Section 28, T11N, R5W, Henderson County. The land surface elevation at the well is approximately 530 ft.

COLLECTOR WELL NO. 1, DRILLERS LOG

<i>Strata</i>	<i>Thickness (ft)</i>	<i>Depth (ft)</i>
Fill	6	6
Brown sandy clay	10	16
Fine sand, silt	13	29

Strata	Thickness (ft)	Depth (ft)
Fine sand, scattered gravel	10	39
Medium pea gravel, fine sand, silt	13	52
Very fine sand, silt	13	65
Medium pea gravel, fine sand, silt	33	98

The reinforced concrete caisson (13 ft ID by 16 ft OD) was constructed from about 11.2 ft above land surface to a depth of 97 ft. Nine 12-in. diameter perforated steel pipe laterals were projected radially toward the river from the collector at a depth of 90 ft below land surface. In 1980, this well was rehabilitated by developing, cleaning, flushing, and measuring the flow in seven of the laterals. Two laterals were added and two laterals were abandoned. The length of each lateral when it was installed and as shown by camera are given in the following table.

Lateral	Length when installed (ft)	Camera length in 1980 (ft)	Remarks
1	236	190	
2	168	136	
3	232	188	
4	216	180	
4A	200	-	installed 1980
5	108	91	abandoned
5A	200	-	installed 1980
6	200	155	
7	208	165	
8	200	170	
9	232	167	abandoned

In 1971, the nonpumping water level was reported to be 13 ft.

A production test using seven observation wells was conducted on February 4-8, 1958, using two pumps giving a combined rate of 5752 gpm. After 86.6 hr of pumping at a rate of 5752 gpm, the drawdown was 15.61 ft from a nonpumping water level of 13.27 ft below the top of the collector.

The pumping equipment presently installed consists of two 24-in. Byron Jackson turbine pumps (Type KXL), each rated at 5000 gpm at about 400 ft TDH, and powered by a 600-hp Westinghouse electric motor, and one Byron Jackson pump rated at 3000 gpm, and powered by a 300-hp U. S. electric motor.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B022362) is for a water sample from the well collected December 5, 1983, after 24 hr of pumping at 5000 gpm.

COLLECTOR WELL NO. 1, LABORATORY NO. B022362

		mg/L	me/L			mg/L	me/L
Iron	Fe	0.59		Silica	SiO ₂	18	
Manganese	Mn	0.256		Fluoride	F	0.10	
Ammonium	NH ₄	<0.1		Boron	B	<0.05	
Sodium	Na	6	0.26	Cyanide	CN	<0.005	
Potassium	K	1.1	0.03	Nitrate	NO ₃	5.3	0.09
Calcium	Ca	58	2.89	Chloride	Cl	10	0.28
Magnesium	Mg	21.3	1.75	Sulfate	SO ₄	28	0.58
Strontium	Sr	0.090	0.00	Alkalinity (as CaCO ₃)		188	3.76
Aluminum	Al	<0.05		Hardness (as CaCO ₃)		233	4.66
Arsenic	As	<0.001					
Barium	Ba	0.022	0.00	Total dissolved			
Beryllium	Be	<0.0005		minerals		256	
Cadmium	Cd	<0.003					
Chromium	Cr	<0.005					
Cobalt	Co	<0.005					
Copper	Cu	<0.005					
Lead	Pb	<0.005					
Mercury	Hg	<0.00010					
Nickel	Ni	0.008					
Selenium	Se	0.001					
Silver	Ag	<0.005					
Vanadium	V	<0.005					
Zinc	Zn	<0.005		pH (as rec'd)		7.7	

WELL NO. 74-1, finished in sand and gravel of the Prairie Aquigroup, was completed in January 1975 to a depth of 101 ft by Luhr Bros., Inc., Columbia. The well is located about 550 ft southeast of Collector Well No. 1, approximately 1265 ft S and 25 ft E of the NW corner of Section 27, T11N, R5W, Henderson County. The land surface elevation at the well is approximately 530 ft.

WELL NO. 74-1, DRILLERS LOG

Strata	Thickness (ft)	Depth (ft)
Clay, dark gray	10	10
Sand, silty	5	15
Sand, tan, medium	15	30
Sand, very coarse with gravel to 3/4 in.	5	35
Clay, dark gray	5	40
Sand, dark gray with pea gravel	45	85
Sand, yellow medium with trace of pea gravel	10	95
Sand, yellow very coarse with trace of pea gravel	10	105

A 34-in. diameter hole was drilled to a depth of 101 ft. The well is cased with 16-in. steel pipe from 12 ft above land surface to a depth of 74.2 ft followed by 26.8 ft (30.5 ft overall length) of 16-in. No. 50 slot Johnson stainless steel screen. The annulus between the bore hole and the casing-screen assembly is filled with concrete from 0 to 10 ft, with torpedo sand from 10 to 15.5 ft, and with No. 2 Northern gravel from 15.5 to 101 ft. For flood protection, the well is equipped with two corrugated steel pipes, 10 and 12 ft in diameter, extending from 11 ft above to 4 ft below land surface. The annulus between these two pipes is filled with concrete.

A production test using two observation wells was conducted by the driller on January 20, 1975. After 4 hr of pumping at a rate of 1500 gpm, the final drawdown was 21.21 ft from a nonpumping water level of 10.30 ft below land surface. Fifteen min after pumping was stopped, the water level had recovered to 11.14 ft.

The pumping equipment presently installed is a Byron Jackson vertical turbine pump set at 75 ft, rated at 1780 gpm at about 445 ft head, and powered by a 350-hp General Electric motor (No. 6318P24).

A partial analysis of a sample (Lab. No. 197738) collected January 21, 1975, after pumping for 3.5 hr, showed the water to have a hardness of 226 mg/L, total dissolved minerals of 271 mg/L, and an iron content of 1.1 mg/L.

WELL NO. 74-2, finished in sand and gravel of the Prairie Aquigroup, was completed in January 1975 to a depth of 97 ft by Luhr Bros., Inc., Columbia. The well is located about 275 ft south of Well No. 74-1, approximately 1540 ft S and 10 ft W of the NE corner of Section 28, T11N, R5W, Henderson County. The land surface elevation at the well is approximately 530 ft.

WELL NO. 74-2, DRILLERS LOG

<i>Strata</i>	<i>Thickness (ft)</i>	<i>Depth (ft)</i>
Blue silty clay	2	2
Fine brown sand	9	11
Fine brown sand with dirty clay	2	13
Medium fine brown sand	17	30
Gray sand with some gravel and cobbles, gray clay layer 33 to 36 ft	10	40
Dark gray sand, medium	36	76
Orange brown sand, coarse with gravel	5	81
Orange brown sand, medium coarse with gravel	5	86
Orange brown sand, very coarse with gravel	7	93
Gray sand, very coarse with heavy cobbles	12	105

A 34-in. diameter hole was drilled to a depth of 97 ft. The well is cased with 16-in. steel pipe from 12 ft above land surface to a depth of 71.7 ft followed by 25.3 ft (30.5 ft overall length) of 16-in. No. 50 slot Johnson stainless steel screen. The annulus between the bore hole and the casing-screen assembly is filled with concrete from 0 to 10 ft, with torpedo sand from 10 to 11.5 ft, and with No. 2 Northern gravel from 11.5 to 97 ft. For flood protection, the well is equipped with two corrugated steel pipes, 10 and 12 ft in diameter, extending from 11 ft above to 4 ft below land surface. The annulus between these two pipes is filled with concrete.

A production test using two observation wells was conducted by the driller on January 16, 1975. After 4 hr of pumping at a rate of 1500 gpm, the final drawdown was 12.07 ft from a nonpumping water level of 9.91 ft below

land surface. Fifteen min after pumping was stopped, the water level had recovered to 10.81 ft.

The pumping equipment presently installed is a Byron Jackson vertical turbine pump set at 75 ft, rated at 1780 gpm at about 445 ft head, and powered by a 350-hp General Electric motor (No. 6318P24).

A partial analysis of a sample (Lab. No. 197739) collected during the initial production test, after pumping for 3.5 hr, showed the water to have a hardness of 260 mg/L, total dissolved minerals of 308 mg/L, and an iron content of 0.5 mg/L.

WELL NO. 74-3, finished in sand and gravel of the Prairie Aquigroup, was completed in January 1975 to a depth of 102 ft by Luhr Bros., Inc., Columbia. The well is located about 275 ft south of Well No. 74-2, approximately 1815 ft S and 30 ft W of the NE corner of Section 28, T11N, R5W, Henderson County. The land surface elevation at the well is approximately 530 ft.

WELL NO. 74-3, DRILLERS LOG

<i>Strata</i>	<i>Thickness (ft)</i>	<i>Depth (ft)</i>
Silty sand, brownish gray	15	15
Fine gray sand	5	20
Fine to medium brown sand with gravel (water bearing)	10	30
Coarse gray sand with gravel (water bearing)	25	55
Medium gray sand with gravel (water bearing)	5	60
Fine to medium gray sand, no gravel (water bearing)	10	70
Fine to medium gray sand with gravel (water bearing)	5	75
Fine gray sand	5	80
Fine to medium sand with gravel (water bearing)	10	90
Coarse sand with gravel (water bearing)	10	100
Medium coarse gray sand with very coarse gravel (water bearing)	5	105

A 34-in. diameter hole was drilled to a depth of 102 ft. The well is cased with 16-in. steel pipe from 12 ft above land surface to a depth of 74.5 ft followed by 27.5 ft (30.5 ft overall length) of 16-in. No. 50 slot Johnson stainless steel screen. The annulus between the bore hole and the casing-screen assembly is filled with concrete from 0 to 10 ft, with torpedo sand from 10 to 16.5 ft, and with No. 2 Northern gravel from 16.5 to 102 ft. For flood protection, the well is equipped with two corrugated steel pipes, 10 and 12 ft in diameter, extending from 11 ft above to 4 ft below land surface. The annulus between these two pipes is filled with concrete.

A production test using two observation wells was conducted on January 22, 1975, by representatives of the driller, the city, the State Water Survey, and Casler,

Houser & Hutchinson, Consulting Engineers. After 4 hr of pumping at rates of 1522 to 1493 gpm, the final draw-down was 12.34 ft from a nonpumping water level of 7.83 ft below land surface. Fifteen min after pumping was stopped, the water level had recovered to 8.70 ft.

The pumping equipment presently installed is a Byron Jackson vertical turbine pump set at 75 ft, rated at 1780 gpm at about 445 ft head, and powered by a 350-hp General Electric motor (No. 6318P24).

A partial analysis of a sample (Lab. No. 197740) collected during the initial production test, after pumping for 3.5 hr at 1500 gpm, showed the water to have a hardness of 236 mg/L, total dissolved minerals of 276 mg/L, and an iron content of 0.2 mg/L.

Hydrologic analyses of the results of the production tests on Well Nos. 74-1, 2, and 3, indicated that the three-well system was capable of furnishing 8 mgd (1850 gpm per well) on a long-term basis.